

Amended Claims

1. (Currently Amended) A method of digital image compression, comprising:

identifying a plurality of areas of interest in at least a subset of digital images in a sequence of related images;

~~extrapolating areas of interest for a remainder of images in the sequence from the identified areas of interest in said subset; and~~

encoding the identified areas of interest at a first quality level and unidentified areas of the image at a second and lower quality level than the identified areas in order to produce a single compressed copy of each image which can be decoded at a decoder, wherein:

the areas of interest are identified by a group of viewers; and

said group of viewers comprises a statistically representative subset of an intended audience for the sequence of related images in order to predict areas of interest of the intended audience.

2. (Original) A method in accordance with claim 1, further comprising:

creating a quantization map based on the identified areas of interest, wherein:

the encoding is performed based on the quantization map.

3-5. (Cancelled).

6. (Currently amended) A method in accordance with claim 1, wherein the areas of interest are identified by tracking the eye gaze point of ~~one or more~~ said viewers as the ~~one or more~~ viewers view the image.

7. (Currently amended) A method in accordance with claim 1, wherein the areas of interest are identified by ~~one or more~~ said viewers using a pointing device to designate the areas of interest on a display of the image.

8. (Currently amended) A method in accordance with claim 1, wherein the areas of interest are identified ~~by a group of viewers~~ in said subset, said method further comprising:
extrapolating areas of interest for a remainder of
images in the sequence from the identified areas of
interest in said subset.

9. (Currently amended) A method in accordance with claim 1
8, wherein:

the sequence of related images comprises a digital motion picture; ~~and~~

~~the group of viewers comprises a statistically representative subset of an intended audience for the motion picture in order to predict areas of interest of the intended audience.~~

10. (Original) A method in accordance with claim 8, wherein a histogram is used to determine the most popular areas of interest.

11. (Original) A method in accordance with claim 1, wherein the areas of interest are identified in real time during a live transmission of the image.

12. (Original) A method in accordance with claim 1, wherein the digital image is a spatially representative version of the image to be encoded.

13. (Original) A method in accordance with claim 1, further comprising:

 assigning values to each area of interest based on the amount of interest in that area, first values being assigned to areas with higher interest and second values being assigned to areas of lower interest; and

 encoding each area of interest at a quality level corresponding to the assigned value, said areas with said first values being encoded at higher quality levels than said areas with said second values.

14. (Original) A method in accordance with claim 1, wherein said encoding is performed to provide a gradual transition in quality between an identified area of interest and an unidentified area.

15. (Original) A method in accordance with claim 1, wherein the encoding is performed using a block discrete cosine transform (DCT).

16. (Original) A method in accordance with claim 15, wherein the quality level for blocks of pixels is adjusted for the areas of interest through the use of a quantization scale factor encoded for each block of pixels.

17. (Original) A method in accordance with claim 15, wherein the quality levels of the unidentified areas are adjusted downward by one of: (i) truncating one or more DCT frequency coefficients; (ii) setting to zero one or more DCT frequency coefficients; or (iii) otherwise discarding one or more DCT frequency coefficients, on a block by block basis.

18. (Original) A method in accordance with claim 1, wherein the encoding is performed using a wavelet transform.

19. (Original) A method in accordance with claim 1, wherein the quality level for the unidentified areas is adjusted downward by pre-filtering the image with a spatially varying spatial frequency filter prior to encoding.

20. (Currently Amended) A method of digital image compression comprising:

- identifying a plurality of areas of interest in the digital image;

- sampling the identified areas of interest at a higher spatial resolution than unidentified areas of the image;

- encoding the identified areas of interest at a first quality level for transmission to a decoder in one or more additional data streams; and

encoding the unidentified areas of the image at a second and lower quality level than the identified areas for transmission to the decoder in a separate data stream from that containing the identified areas;

wherein:

said data stream containing said unidentified areas does not contain any information needed to recreate said identified areas of interest;

the areas of interest are identified by a group of viewers; and

said group of viewers comprises a statistically representative subset of an intended audience for the image in order to predict areas of interest of the intended audience.

21. (Cancelled).

22. (Original) A method in accordance with claim 20, wherein:

the additional data stream(s) are encoded using a first method; and

a data stream containing the unidentified areas is encoded using a second method.

23. (Original) A method in accordance with claim 1, wherein the areas of interest are identified while the image is in transit.

24. (Original) A method in accordance with claim 1, wherein the areas of interest are identified while the image is partially displayed.

25. (Original) A method in accordance with claim 1, wherein the quality level of the unidentified areas of the image is reduced for security purposes.

26. (Original) A method in accordance with claim 1, wherein one of a constant bit rate or a constant compression ratio is maintained.

27. (Original) A method in accordance with claim 1, wherein:

the identified areas of interest are transmitted according to level of interest, so that areas with a higher level of interest are transmitted first with successively lower interest level areas transmitted successively thereafter; and

the image is built up as it is received starting with the areas of highest interest.

28. (Original) A method in accordance with claim 1, wherein identified areas of interest from multiple images are statistically recorded.

29. (Cancelled).

30. (Previously presented) A method in accordance with claim 1, further comprising:

enhancing the quality levels of certain unidentified areas to artificially create additional areas of interest from said certain unidentified areas in order to draw a viewer's attention to said additional areas of interest.

31. (Previously presented) A method in accordance with claim 30, wherein the additional areas of interest are image areas containing at least one of a product and a name of a product.

32. (Currently Amended) A system for digital image compression, comprising:

a digital image display;

means for a group of viewers to identifying a plurality of areas of interest in at least a subset of digital images in a sequence of related images provided by said display;

~~means for extrapolating areas of interest for a remainder of images in the sequence from the identified areas of interest in said subset; and~~

an encoder, wherein the encoder encodes the identified areas of interest at a first quality level and unidentified areas of the image at a second and lower quality level than the identified areas in order to produce a single compressed copy of each image which can be decoded at a decoder;

wherein the group of viewers comprises a statistically representative subset of an intended audience for the sequence of related images in order to predict areas of interest of the intended audience.

33. (Original) A system in accordance with claim 32, further comprising a quantization map created based on said identified areas of interest, wherein:

the encoding is performed based on the quantization map.

34-36. (Cancelled).

37. (Currently amended) A system in accordance with claim 32, wherein the means for identifying areas of interest comprises ~~one or more~~ eye tracking mechanisms for tracking the eye gaze point of ~~one or more~~ the viewers as the ~~one or more~~ viewers view the image.

38. (Currently amended) A system in accordance with claim 32, wherein the means for identifying areas of interest comprises a pointing devices for ~~one or more viewers to designate~~ designating the areas of interest on the image display.

39. (Currently amended) A system in accordance with claim 32, wherein the areas of interest are identified ~~by a group of viewers~~ in said subset, said system further comprising:
means for extrapolating areas of interest for a remainder of images in the sequence from the identified areas of interest in said subset.

40. (Currently amended) A system in accordance with claim 32 ~~39~~, wherein:

the sequence of related images comprises a digital motion picture, ~~and~~

~~the group of viewers comprises a statistically representative subset of an intended audience for the motion picture in order to predict areas of interest of the intended audience.~~

41. (Original) A system in accordance with claim 39, wherein a histogram is used to determine the most popular areas of interest.

42. (Original) A system in accordance with claim 32, wherein the areas of interest are identified in real time during a live transmission of the image.

43. (Original) A system in accordance with claim 32, wherein the digital image is a spatially representative version of the image to be encoded.

44. (Original) A system in accordance with claim 32, wherein:

values are assigned to each area of interest based on the amount of interest in that area, first values being assigned to areas with higher interest and second values being assigned to areas of lower interest; and

each area of interest is encoded at a quality level corresponding to the assigned value, said areas with said first values being encoded at higher quality levels than said areas with said second values.

45. (Original) A system in accordance with claim 32, wherein said encoding is performed to provide a gradual transition in quality between an identified area of interest and an unidentified area.

46. (Original) A system in accordance with claim 32, wherein the encoding is performed using a block discrete cosine transform (DCT).

47. (Original) A system in accordance with claim 46, wherein the quality level for blocks of pixels is adjusted for the areas of interest through the use of a quantization scale factor encoded for each block of pixels.

48. (Original) A system in accordance with claim 46, wherein the quality levels of the unidentified areas are adjusted downward by one of: (i) truncating one or more DCT frequency coefficients; (ii) setting to zero one or more DCT frequency coefficients; or (iii) otherwise discarding one or more DCT frequency coefficients, on a block by block basis.

49. (Original) A system in accordance with claim 32, wherein the encoding is performed using a wavelet transform.

50. (Original) A system in accordance with claim 32, further comprising:

a spatially varying spatial frequency filter, wherein the quality level for the unidentified areas is adjusted

downward by pre-filtering the image using the spatial frequency filter prior to encoding.

51. (Currently amended) A system for digital image compression, comprising:

a digital image display;

means for a group of viewers to identifying a plurality of areas of interest in a digital image provided by said display; and

an encoder, wherein the encoder encodes the identified areas of interest at a first quality level and encodes unidentified areas of the image at a second and lower quality level than the identified areas; wherein

the identified areas of interest are sampled at a higher spatial resolution than the unidentified areas; and

the encoder encodes the identified areas of interest at said first quality level for transmission to a decoder in one or more additional data streams; and

the encoder encodes the unidentified areas of the image at said second and lower quality level for transmission to the decoder in a separate data stream from that containing the identified areas;

wherein:

said data stream containing said unidentified areas does not contain any information needed to recreate said identified areas of interest; and

said group of viewers comprises a statistically representative subset of an intended audience for the image in order to predict areas of interest of the intended audience.

52. (Cancelled).

53. (Original) A system in accordance with claim 51,
wherein:

the additional data stream(s) are encoded using a
first method; and

a data stream containing the unidentified areas is
encoded using a second method.

54. (Original) A system in accordance with claim 32,
wherein the areas of interest are identified while the
image is in transit.

55. (Original) A system in accordance with claim 32,
wherein the areas of interest are identified while the
image is partially displayed.

56. (Original) A system in accordance with claim 32,
wherein the quality level of the unidentified areas of the
image is reduced for security purposes.

57. (Original) A system in accordance with claim 32,
wherein one of a constant bit rate or a constant
compression ratio is maintained.

58. (Original) A system in accordance with claim 32,
wherein:

the identified areas of interest are transmitted
according to level of interest, so that areas with a higher

level of interest are transmitted first with successively lower interest level areas transmitted successively thereafter; and

the image is built up as it is received starting with the areas of highest interest.

59. (Original) A system in accordance with claim 32, wherein identified areas of interest from multiple images are statistically recorded.

60. (Cancelled).

61. (Previously presented) A system in accordance with claim 32, wherein the quality levels of certain unidentified areas are enhanced to artificially create additional areas of interest from said certain unidentified areas in order to draw a viewer's attention to said additional areas of interest.

62. (Previously presented) A system in accordance with claim 61, wherein the additional areas of interest are image areas containing at least one of a product and a name of a product.

63. (Previously presented) A method of digital image compression, comprising:

identifying a plurality of areas of interest in each digital image in a digital motion picture by tracking the eye gaze point of a plurality of viewers as the viewers view each image;

encoding the identified areas of interest of each image at a first quality level and unidentified areas of each image at a second and lower quality level than the identified areas in order to produce a single compressed copy of each image which can be decoded at a standard decoder;

wherein the plurality of viewers comprises a statistically representative subset of an intended audience for the motion picture in order to predict areas of interest of the intended audience.

64. (Previously presented) A system for digital image compression, comprising:

a digital image display device for displaying a related sequence of digital images comprising a digital motion picture;

a plurality of eye tracking mechanisms for tracking the eye gaze of a plurality of viewers as the viewers view each digital image in the digital motion picture order to identify a plurality of areas of interest in each digital image; and

an encoder, wherein the encoder encodes the identified areas of interest of each image at a first quality level and encodes unidentified areas of each image at a second and lower quality level than the identified areas in order to produce a single compressed copy of each image which can be decoded at a standard decoder;

wherein the plurality of viewers comprises a statistically representative subset of an intended audience

for the motion picture in order to predict areas of interest of the intended audience.